Physics Days

Tuesday, May 8 and Wednesday, May 9 2001

Six Flags GREAT AMERICA

Dear Physics Instructor:

Six Flags Great America and Physics share a common ground. Physics Days incorporates a strong educational format in a recreational atmosphere. The Park's numerous rides and attractions utilize the many laws and theories of Physics. Where else can your students learn more about the rules of acceleration and motion or the laws of centripetal force and linear speed?

It's easy to understand why Physics Days have become so popular with teachers and students alike! Last year, over 20,000 students participated in experiments based on exercises outlined in the Physics Workbook, (see sample exercise on back page). Physics Days is also endorsed by the Amusement Park Physics Committee of the Midwest Physics Alliances.

We need to limit the number of students to 10,000 on each day. This will allow more time for students to participate in the physics experiments. This worked extremely well in past years. In order to ensure your group's participation on either of these two dates we need to receive your order right away. Orders will be processed on a first come first serve basis. Those orders not received in the first 10,000 for each date will need to choose another date. Due to the exclusivity of this event, ***Season Passes will not be valid*** on May 8 or 9.

We will be hosting an educational series on Physics for teachers and students once again. The series will be conducted by Mr. Nate Unterman, a Physics teacher at Glenbrook North High School. Nate is a member of the American Association of Physics Teachers and Author of *Amusement Park Physics: A Teacher's Guide.*

We take great pride in offering an outstanding educational experience and will continue to utilize your suggestions to develop new and exciting Physics Day activities. If you have any questions, or need additional information, please feel free to call 847-249-1952.

Sincerely,

Kris Ellsworth

Special Events Representative

New this year on Physics Days

To make sure your students get a nutritional meal during the day we are offering a complete admission and meal package that is the best value for you and your students.

For Tuesday, May 8 and Wednesday, May 9 orders only.

- **BEST BUY** $35.50 per person includes Park Admission and All-You-Can-Eat Meal *($52.95 value)*
- $27.00 for Park Admission Only

All-You-Can-Eat Meal in our Picnic Grove includes:

Fried chicken, hot dogs, meatless mostaccioli, potato salad, pasta salad, potato chips, pickle spears and unlimited soft drinks. You may enter the Picnic Grove any time from 11:00 a.m. – 12:30 p.m. for your meal.

Physics Day Information

Back by popular demand…

Six Flags will be teaming up with Vernier Software and Texas Instruments again to take data electronically on the rides. Teachers or their designated student will wear a vest containing a Vernier LabPro or TI CBLII and accelerometer. At the end of the ride, the data will be downloaded to a computer and the teacher can bring a disc to receive that data. This equipment proved to give great data readings and we are excited to bring it back again this year!

If you would like to volunteer to spend an hour at a ride helping take data, please contact Ann Brandon at *LLBrandon@aol.com.* Additional information can be found at *www.newton.dep.anl.gov/app/info.htm.*

Manual Information

There are no new experiments to add this year. If you need the student physics manual, you can go on-line after March 1, 2001 to www.newton.dep.anl.gov/app/info.htm and download it. If you need the teachers manual please order it with your tickets.

Physics Schedule

Tuesday, May 8 and Wednesday, May 9, 2001

9:00 a.m.	Park Opens
10:30 a.m.	***Educational Session I*** Science and Engineering of Rides (for students and teachers)
11:00 a.m. – 12:30 p.m.	***Picnic Lunch*** (for those who have prepaid for the lunch tickets)
12:30 p.m.	***Educational Session II*** Suggested Teaching Techniques for Theme Parks (for teachers only)
5:00 p.m.	Park Closes

2001 Operating Calendar

Spring Weekend: May 5 – May 6

Daily Operation: May 12 – August 26

Labor Day Weekend: September 1 – September 3

Fall Weekends: *(Saturdays & Sundays only):* September 8 – September 23

Record Breaking, History Making!

For the first time ever, two new roller coasters will be making their way to Six Flags Great America. In late Spring 2001, both state-of-the-art rides will open to cheers and fan fare. This next generation inverted boomerang coaster will be one of the world's tallest and fastest of its kind. Thrill seekers will plummet from 177-feet, flying head-over-heels at 65 mph over the outside of a vertical loop and giant 110-foot high boomerang turn with nothing but the sky above their dangling feet. One time forwards and one time backwards.

Also opening in late Spring 2001 is an amazing new coaster with technology never before seen at Six Flags Great America. Using Liner Induction Motors, this ski-lift style coaster is launched out of the loading station to skyrocketing speeds of 65 mph in virtually seconds! The U-shaped track with spiraled first tower will take riders on an incredible journey three times to the spiraled front tower and two times to the back tower!

Due to maintenance and other circumstances, certain rides and attractions (including new rides) may not be open to public.

Six Flags offers something for everyone!

Physics Day Ticket Order Form

We're visiting on:

❑ Tuesday, May 8 ❑ Wednesday, May 9 ❑ Any other Date: _____

Organization Name: _____

Group Leader: _____

Title: _____

Address *(No P.O. Boxes):* _____

City: _____ State: _____ Zip: _____

Day Phone: ( ) _____ Evening Phone: ( ) _____

Ticket Information:

Ticket Type	Price	Quantity	Total
BEST BUY **Physics I Including Meal** *Valid only May 8 or 9*	$35.50		$
Physics I *Valid only May 8 or 9*	$27.00		$
Physics II *Valid any regular operating day*	$27.80		$
Comp – *1 per 20 Tickets Purchased*	FREE		$0.00
Teachers Manual	$5.00		$
Processing Fee: for those groups ordering 7 or more business days (Monday - Friday) in advance and receiving FREE Federal Express delivery of their tickets.			$5.00
			or
Processing Fee: for those groups ordering 3-6 business days (Monday - Friday) in advance and picking up their tickets at Guest Relations on their visit date.			$10.00
Grand Total			**$**

Payment Method:

My payment is enclosed. *(Multiple checks will not be accepted.)*

Check Number: _____ Amount $: _____

Please Charge: ❑ American Express ❑ MasterCard ❑ Visa ❑ Discover

Acct. Number: _____ Exp. Date: _____

Name on Card: _____

Signature: _____

Mailing address must be the same as credit card billing address or both addresses must be provided.

Ticket Ordering Policy

Please be accurate when ordering your tickets. If extra tickets are needed, you may purchase a maximum of 10 additional tickets at Guest Relations on the day of your visit at the original discounted rate. If more that 10 tickets are needed, you may purchase those tickets for $36.99 plus tax, a $3.00 discount off the main gate ticket of $39.99 plus tax. ***SORRY NO REFUNDS.***

Exclusive Dates

If you are able to attend on one of the exclusive Physics Day dates the ticket price will be $27.00 per ticket, which is a savings of over $14.00 per ticket. There is no minimum ticket order. You will also receive one complimentary ticket for every 20 tickets purchased. Orders will be processed on a first come first serve basis. If your prepaid order is received in the first 10,000 tickets for each date AND by Thursday, April 26, 2001 we will send your tickets via 2-day Federal Express; a $5.00 processing fee applies. Any order received after April 26 but prior to May 3 may be picked up at Guest Relations on the Physics Day of your choice providing we have not reached our 10,000 limit; a $10.00 processing fee applies. Physics Day is a private event, therefore, only Physics Day tickets are accepted on May 8 and 9. ***Season passes are not valid.***

Now your students can use their Physics Day ticket stub to receive a credit of $27.00 towards the cost of purchasing a full price season pass of $87.95 plus tax. All they have to do is take their Physics Day ticket stub to Guest Relations ***on the day they attend Physics Day*** and pay the difference. They will receive a voucher to process their season pass on another day.

All Other Dates

If you are unable to attend on May 8 or 9 the ticket price will be $27.80 per ticket, which is a savings of over $13.00 per ticket. There is no minimum ticket order. You will also receive one complimentary ticket for every 20 tickets purchased. If we receive your order 7 or more business days (Monday – Friday) in advance, you will receive your tickets via Federal Express delivery; a $5.00 processing fee applies. If we receive your order within 3-6 business days (Monday – Friday) in advance, your tickets will be at Guest Relations for you to pick up on your visit date; a $10.00 processing fee applies.

Note: Bus drivers with a capacity of 25 or more passengers will receive a voucher at the Park's entry plaza. Ticket vouchers may be exchanged at Guest Relations for FREE admission on that day.

Six Flags Great America is dedicated to providing the highest quality of service and entertainment in a family atmosphere. In consideration of others, we ask that our guests observe our park policies with regards to dress code, language and behavior.

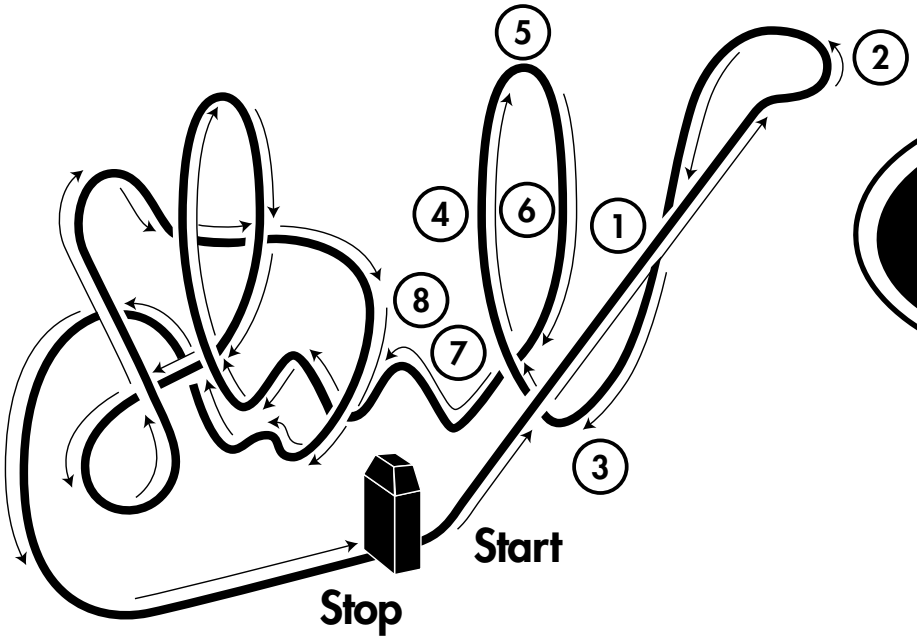
Return this order form by mail to:

Six Flags Great America
Physics Day
542 N. Route 21
Gurnee, IL 60031

OR Fax to: 847-249-1798

For more information, ***call 847-249-1952.***

Testing the Physics of Batman The Ride



BATMAN™
THE RIDE

1. Calculate the force due to the track, force due to the chain, and the force down the plane due to gravity for a ride up the high rise.
2. Calculate the minimum horsepower needed to haul one Batman train up the high rise.
3. Estimate the speed of the Batman train as it bottoms out right before the first vertical loop.
4. Produce a force diagram for the train in the vertical loop at the following clock positions: 3, 6, 9 and 12 o'clock. Is the force of the track at 12 o'clock the same magnitude as the force of the track at 6 o'clock? Please explain. Calculate the force of the seat for a 60 kg. person at the 3, 9 and 12 o'clock positions.
5. When the train is at the bottom of the first vertical loop, will the supporting feet for the vertical loop push up or pull down at point A? Answer the same question for point B. Please support your answers.
6. Compare the radius of the first vertical loop of Batman to the radius of the first vertical loop of the Iron Wolf. Does each vertical circle have the same radius? Explain any differences. Even though a passenger is riding on the outside of the vertical loop for the Batman ride, does one experience the same sensation for both the Batman and Iron Wolf vertical circles?
7. It has been said that one can easily lose their shoes during this ride. Where would this most likely to happen? If you lost your shoes at your predicted location, where would you place a shoe catcher along the ground?
8. Position yourself along the walkway between the first vertical circle and the zero "g" roll section of Batman. Listen to the sound of the train as it travels down the first big hill through the vertical loop and then through the next vertical loop. Is the frequency of the sound due to the train's motion changing pitch? Please explain.

SixFlags®
GREAT AMERICA
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Visit Six Flags on the Web at: www.sixflags.com